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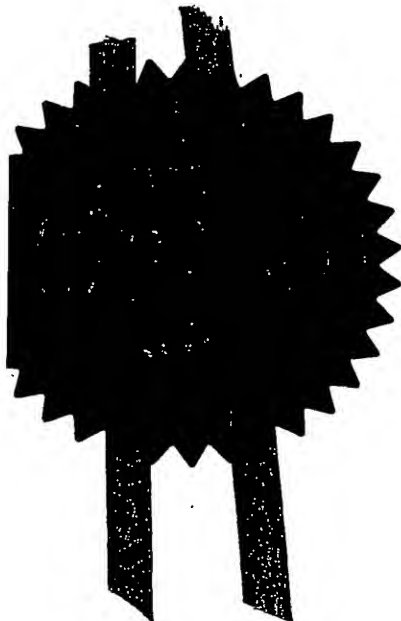
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1. Your reference

RIDGWAY 01/01

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3. Full name, address and postcode of the or of each applicant (underline all surnames)

MICHAEL RIDGWAY  
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Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

4. Title of the invention

PAINT BRUSH AND EXTENSION POLE  
CONNECTION SYSTEM

5. Name of your agent (if you have one)

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

MARTIN J.W. ATCHLEY  
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4099842003

Patents ADP number (if you know it)

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Country	Priority application number (if you know it)	Date of filing (day / month / year)
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UK	GB01253943	23/10/01

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8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

- a) any applicant named in part 3 is not an inventor, or
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Continuation sheets of this form

Description

10

Claim(s)

1

Abstract

1

Drawing(s)

8 + 8

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Priority documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (Patents Form 7/77)

Request for preliminary examination and search (Patents Form 9/77)

Request for substantive examination (Patents Form 10/77)

Any other documents (please specify)

11. I/We request the grant of a patent on the basis of this application.

Signature

M. J. W. Fitchley

Date

22 April 2002

12. Name and daytime telephone number of person to contact in the United Kingdom

M. J. W. Fitchley

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## PAINT BRUSH AND EXTENSION POLE CONNECTION SYSTEM

The present invention relates to a connection system for connecting a paint brush to an extension pole. One end of the extension pole is connected to the handle of the paint brush by the connection system and the other end of the extension pole is held by the user of the paint brush.

Paintbrushes, rollers and paint pads are popular tools for the application of paint and there is also a great demand for extension poles to help get paint to areas that are difficult to reach. However, although people often connect a roller or paint pad to the end of an extension pole, they do not often do this with a paintbrush.

The main reason for this is that when a paintbrush is connected to the end of an extension pole, a crucial aspect of the operation of the brush is lost with the result that the brush becomes a much less efficient tool than when held directly in the hand. This crucial aspect is the capacity to rotate the brush about its own axis, which is a line extending from the bristles of the brush through the centre line of the handle, in the course of paint application. This is done frequently with a hand held brush. The brush needs to be rotated in order to manage the paint within it and with changes of direction of brush strokes and this is an important factor in the accuracy, speed and general efficiency of the use of a paint brush.

With prior art connection systems for connecting a paint brush to an extension pole, the brush cannot be turned about its axis in the course of applying paint because it is out of the reach of the user at the end of the extension pole and is therefore held in a fixed position relative to the extension pole. In order to rotate the brush about its axis it is necessary to take it away from the wall and release a catch in the mechanism connecting the brush to the extension pole which is a relatively awkward thing to have to do repeatedly and slows down the work.

The object of the present invention is to provide an improved connection system for connecting a paint brush to an extension pole.

According to the invention a connection system for connecting an extension pole to a paint brush comprises a rotary connection device including a first rotary member having a concave internal cylindrical surface and a second rotary member located within and substantially coaxial with the first rotary member and having a convex cylindrical surface positioned adjacent to the concave cylindrical surface of the first rotary member, means for attaching one of the rotary members to the extension pole, and means for attaching the other rotary member to the paint brush. If the bristles of the paint brush are placed in a painting position against a surface with the axis of the brush extending substantially perpendicular to the surface and the extension pole is moved with a circular motion about an axis substantially coinciding with the axis of the brush, the cylindrical surfaces of the two rotary members will interact and cause the brush to rotate about its axis.

According to one version of the invention, the first rotary member is attached to the paint brush and the second rotary member is attached to the extension pole. If the extension pole is moved with a circular motion in a clockwise direction this results in the brush rotating about its axis in a clockwise direction.

According to another version of the invention, the second rotary member is attached to the extension pole and the first rotary member is attached to the paint brush. If the extension pole is moved with a circular motion in an anti-clockwise direction this results in the brush rotating about its axis in an anti-clockwise direction.

In order that the invention may be more readily understood, embodiments of the invention will now be described with reference to the accompanying drawings, in which:

Figure 1 shows a known system for connecting a paint brush to an extension pole.

Figure 2 shows an first embodiment of the invention with the paint brush attached to the extension pole at a fixed angle,

Figure 3 shows a second embodiment of the invention with the paint brush attached to the extension pole with an angle adjustment system,

Figure 4 shows in perspective an exploded view of the angle adjustment system illustrated in Fig 3,

Figure 5 shows in perspective an exploded view of the embodiment of the invention illustrated in Figure 2,

Figure 6 is a side view in cross section of the connection system illustrated in Figure 5.

Figure 7 illustrates the relationship between the extension pole, the paint brush and the wall that is preferably required for operation of a connection system in accordance with the invention, and

Figures 8 and 9 illustrate diagrammatically how the action of the extension pole causes a rotation of the paint brush about its axis.

With reference to Figure 1 a known type of connection system for connecting a paint brush 10 to an extension pole 11 comprises a holder 12 for the handle 13 of the paint brush. The holder 12 is hollow with an open end 14 and a closed end 15. The handle 13 of the paint brush can be inserted through the open end 14 into the holder 12 and retained therein by any suitable means. A threaded rod 16 extends from the closed end 15 and may project into the holder 12 to be used in retaining the handle 13 in the holder 12. A rod 17 is attached to one end 18 of the extension pole 11 and is connected to one end of an intermediate member 19 by a threaded member 21 extending through co-operating holes in the rod 17 and the intermediate member 19 and a wing nut 22. This arrangement secures the extension pole 11, the rod 17 and the

intermediate member 19 together but allows angular adjustment of the extension pole 11 relative to the intermediate member 19.

When the brush 10 is presented to a wall so that paint can be applied to the wall, the brush 10 will not rotate because it is held in a fixed position by the connection system described. During the course of paint application the brush 10 cannot therefore be rotated about its axis to counter the effect of gravity on the paint, to accommodate changes of direction of brush stroke or to fully exploit the malleability of the brush bristles when going into corners etc. and this means that the versatility that the brush has when held in the hand is diminished when it is connected to an extension pole by the above described type of connection system.

The brush 10 can be removed from the wall and rotated to a required angle by releasing wing nut 24, turning the brush about its axis to the required position and then tightening wing nut 24 again but this is a relatively time consuming and laborious procedure to have to do repeatedly and it interrupts the flow of the work.

With reference to Figure 2, which illustrates a first embodiment of the invention, one end of an extension pole 11, which is preferably made of metal, is located in a hollow holder 31 and may be retained therein by engagement of two co-operating threaded members or other suitable means (not illustrated). One end 32 of a Z-shaped rod 33 is attached to the free end 34 of the holder 31 and the other end 35 of the rod 33 is attached to the handle 13 of a brush 10 by a rotary connection device 36 (described below with reference to Figures 5 and 6). The rod 33 is shaped so that the axis 37 of the brush 10, which extends generally perpendicular to the outer ends of the bristles 25 of the brush 10 through the centre line of the handle 13, extends at a desired angle to the axis 38 of the extension pole 11, for example at about 45 degrees.

A rotary connection device 36 (not illustrated in Figure 2 but described and illustrated below) is located in a hole 57 in the end of the handle 13 and allows the brush to rotate about the end 35 of the rod 33. The axis of the rotary connection device 36 is parallel to the axis 37 of the brush 10.

Figures 3 and 4 illustrate a second embodiment of the invention with an angle adjustment system 51 which enables the user to adjust the angle between the axis 37 of the brush 10 and the axis 38 of the extension 11 as required.

Figure 4 illustrates a perspective and exploded view of the angle adjustment system 51 in which flange 45 is securely positioned at the top of extension pole holder 31. Another flange 46 is securely connected to one end of rod 33. A bolt 47 which is securely connected to flange 46 at central position 50 extends through hole 48 in flange 45 and is fastened to flange 45 by tightening a wing nut 49.

An appropriate angle between the axis 37 of the paint brush 10 and the axis 38 of the extension pole 11 can thereby be selected by tightening flange 45 to flange 46 after moving rod 33 to the required angular position relative to the extension pole 11.

Figure 5 illustrates a perspective and exploded view of the embodiment of the invention illustrated in Figure 2. The rotary connection device 36 is glued into a receiving hole 55 in the brush handle 13. Brush handle 13 may be made of plastic that is formed so as to include the hole 55.

Figure 6 is a side view in cross section of a preferred version of the rotary connection device 36 (which is commonly used in "mini-rollers" used for painting) contained within the handle 13 of the paint brush 10. The handle 13 is made with a hole 55 of a suitable diameter to securely receive and hold the connection device 36. The rotary connection device 36 is formed with a cylindrical body 56 of outside diameter substantially equal to the inside diameter of the hole 55. A hole 57 of circular cross section forms a concave cylindrical surface which extends axially through the body 56 and expands into a cylindrical chamber 58. Within the chamber 58 is located a cylindrical collar 61 having an outer diameter less than the inner diameter of the chamber 58 and formed with an axial hole 62. In the course of manufacture of the brush, the connection device 36 is inserted into hole 55 and glued to the inner surface of hole 55 so that there is no relative movement between the connection device 36 and

the hole 55. The rod 33 is circular in cross section and its outer surface forms a convex cylindrical surface.

The cylindrical body 56 forms a first rotary member and the rod 33 forms a second rotary member. Together the two rotary members form the rotary connection device 36.

The user connects the paintbrush 10 to the rod 33 by inserting rod 33 through rotary connection device 36 to the point at which it comes to a stop at end of the hole 55. Collar 61 is expandable and grips rod 33 to a degree that prevents unwanted slip between rod 33 and collar 61. Rod 33 is tapered or rounded at the end 63 to open collar 61 as it enters at end 62. Collar 61 prevents rod 33 from coming out of the connection device 36 too easily because collar 61 is trapped within chamber 58. The fact that collar 61 is trapped in chamber 58 causes rod 33 to be retained firmly within connection device 36 because collar 61 grips rod 33 firmly due to its elastic properties.

Hole 57 in the paint brush handle 13 may be formed with a cylindrical recess 64 at the far end of cylindrical hole 55 in order to continue the cylindrical hole 55 beyond the inner end of the connection device 36. This recess 64 may be of any suitable depth and may represent a small or large part of the interior cylindrical surface of cylindrical hole 57.

Any portion of the inner surface of the hollow cylindrical hole 55 within the handle 13 of the brush 10 may, in an optional embodiment of the invention, contain a rough or serrated area for a more positive engagement with the connection device 36 which may, in such an embodiment, also contain a rough or serrated area on its outer surface in a corresponding portion of its outer surface.

Figure 7 illustrates the operation of the connection system of the invention and shows the combination of the paint brush 10 and the extension pole 11 with the brush 10

perpendicular to the wall 71, keeps the brush 10 in contact with the wall 71 and moves the extension pole 11 with a circular action to make the brush 10 move in a small circle around an imaginary axis 72 perpendicular to the wall. The axis 72 substantially coincides with the axis 37 of the brush 10. As described below with reference to Figures 8 and 9, this circular movement causes the brush 10 to rotate about its own axis 37. A clockwise circular movement of the extension pole 11 causes the brush 10 to rotate clockwise and an anticlockwise circular movement of the extension pole 11 causes the brush 10 to rotate anticlockwise. The brush 10 can be rotated in this way until the desired angular position is achieved and the user then stops the circular movement of the extension pole 11 and resumes normal brush strokes.

Figures 8 and 9, which should be viewed together, demonstrate the principle by which the circular movement of the extension pole 11 brings about a rotation of the brush 10 about its axis 37. Figures 8 A, 8B and 8 C represent diagrammatically in perspective, successive positions of the brush 10 during the course of a clockwise rotation of the brush 10 caused by the clockwise circular movement of the extension pole 11.

The axial hole 57 formed within the body 56 of the rotary connection device 56 is illustrated without a method of retaining rod 33 within the hole 57 as this is not necessary for the purpose of illustrating the principle by which the brush 10 is caused to rotate about its axis 37.

Rod 33 is positioned within cylindrical hole 57. The diameter of the convex outer cylindrical surface of the rod 33 is slightly less than the diameter of the concave inner surface of the body 56, which is the diameter of the hole 57. The difference between outer diameter of the rod 33 and the inner diameter of the hole 57 is greatly exaggerated for the purpose of showing how a degree of play between the surface of the rod 33 and the surface of the hole 57 affects contact points between rod 33 and the inner surface of hole 57.

In Figures 8A, 8B and 8C, the rod 33 is illustrated as making contact directly with the inner surface of hole 57 in the body 56 of the rotary connection device 36 located in the hole 55, and it is the difference between the outer diameter of the rod 33 and the

inner diameter of the hole 57 which is relevant. An actual embodiment of the invention only needs a small amount of play for the system to work, which may be so small as to be almost unnoticeable.

In an actual embodiment the outer diameter of the rod 33 may be 5mm in and the inner diameter of the hole 57 may be 6mm, although all dimensions are capable of variation.

In order to rotate the brush 10 about its axis 37, the user positions the brush 10 substantially perpendicular to the wall 71 with the tips of the bristles 24 against the wall 71 and moves the extension pole 11 with a circular action that causes the straight end section of rod 33 within the cylindrical hole 57 in the body 56 of the connection device 36 in the handle 10 of the brush 10 to move in a clockwise direction around an imaginary axis 72 which extends perpendicular to the wall 71. Axis 72 is the axis about which extension pole 11 and the rod 33 are moved around whenever this action takes place. The circular movement of pole 11 about axis 72 causes the brush 10 to rotate about its own axis 37 because the frictional forces at the contact points between the outer surface of rod 33 and the interior surface of the hole 57 cause interior surface of the hole 57 and therefore the brush 10 to rotate around the rod 33.

The pressure of the brush 10 against the wall 71 causes a resistance to the movement of the brush 10 which is acted against in the course of the circular movement of pole 11 about axis 72 resulting in continuously moving contact points between the end of rod 33 and the inner surface of cylindrical hole 57 during the course of the circular movement.

In Figure 8A rod 33 is at a point in its revolution about axis 72 that is above axis 72.

The upward force of rod 33 at this point acting against the resistance of the brush 10 against wall 71, causes the upper part of the end of the rod 33 to be in contact with the upper part of the inner surface of the hole 57 at point 73 and the part of the rod 33

which is near the opening of the hole 57 is in contact with the lower part of the inner surface of the hole 57 at point 74. In Figure 8B rod 33 is at a point in its revolution

contact points 73, 74 to be located horizontally. In Figure 8 C, rod 33 is at a point in its revolution about axis 72 that is below axis 72.

Figure 9 (Figures 9D, 9C, 9E) are diagrammatic representations of the rod 33 and the connection device 33 illustrating the end of rod 33 positioned within the hole 57 within the body of the rotary connection device 36. The position of rod 33 within the hole 57 in Figure 9D corresponds to the position illustrated in Figure 8A. The position of rod 33 within the hole 57 in Figure 9E corresponds to the position illustrated in Figure 8B. The position of rod 33 within the hole 57 in Figure 9D corresponds to the position illustrated in Figure 8C.

At the point of contact at 73 between rod 33 and inner surface of hole 57 moves around the inner surface of cylindrical hole 57, the body 56 of the rotary connection device 36 rotates in the direction of the circular movement of rod 33. This is because when rod 33 progresses in a clockwise direction from the position in Figures 8B and 9D to the position in Figures 8B and 9E and then on to the position in Figures 8C and 9F in a continuous motion, the inner surface of the body 56 of the connection device 36 is progressively rotated in a clockwise direction by the action of rod 33, causing the body 56 of the connection device 36, and thereby the brush 10, to rotate about axis 37 in a clockwise direction. For the same reason, an anticlockwise circular movement action of rod 33 causes the brush 10 to rotate about axis 37 in an anticlockwise direction.

It will be appreciated from the above description with reference to the diagrams in Figures 9A, 9B and 9E that, if the body 56 of the rotary connection device 36 is rotated, the rod 33 will also rotate. In this case clockwise circular movement of the body 56 will cause anti clockwise rotation of the rod 33. Therefore, if the handle 13 of the brush 10 is connected to the rod 33 and the extension pole 11 is connected to the body 56 of the connection device 36, circular movement of the extension pole 11 as described will still result in rotation of the brush about its axis 33. However, in this case, clockwise circular movement of the extension pole 11 will result in anticlockwise rotation of the brush 10, and vice versa.

The circular movement of the extension pole 11 will cause the brush 10 to follow the circular movement of the extension pole 11 as well as to rotate about its axis 37. The tips of the bristles 25 of the brush will thus tend to make a circle on the wall 71. The circle that the brush 10 makes on the wall 71 is minimal and in most painting jobs there is room for this. The diameter of the circle moved through by extension pole 11 about axis 72 may be in the region of 30mm to 40mm. The user continues this action until the paintbrush 10 reaches a point in rotation about its own axis 37 that is desired, at which point the user stops the circular movement of the extension pole 11 and resumes normal brush strokes.

It will be appreciated that, with the movement of the connection system 36 described above, the brush 10 can be turned easily by hand around the rod 33, thus providing a useful paintbrush control facility that enables the user to rotate the brush 10 more quickly and easily than in prior art connection devices without the need to release a catch.

If the rod 33 can be pulled out of the connection device 36 reasonably easily, the facility to turn the brush 10 more easily will be combined with the facility to remove the brush 10 more easily for the purposes of cleaning and use as a hand held brush, thus providing the combined facility of enabling the user to turn the brush 10 more easily and to connect and disconnect the brush 10 from the extension device more easily than is the case with prior art connection devices.

### CLAIMS

1. A connection system for connecting an extension pole (11) to a paint brush (10) comprising a rotary connection device (36) including a first rotary member (56) having a concave cylindrical surface and a second rotary member (33) located within and substantially coaxial with the first rotary member (56) and having a convex cylindrical surface positioned adjacent to the concave cylindrical surface of the first rotary member (56),  
means for attaching one of the rotary members to the extension pole (11), and  
means for attaching the other rotary member to the paint brush (10),  
whereby if the bristles (25) of the paint brush (10) are placed in a painting position against a surface (71) with the axis (33) of the brush extending substantially perpendicular to the surface (71) and the extension pole (11) is moved with a circular motion about an axis (72) substantially coinciding with the axis (33) of the brush, the cylindrical surfaces of the rotary members (56, 33) will interact to cause the brush (10) to rotate about its axis.
2. A connection system as claimed in Claim 1, in which the first rotary member (56) is attached to the paint brush 10 and the second rotary member (33) is attached to the extension pole 11, whereby circular motion of the extension pole 11 in a clockwise direction results in the brush (10) rotating about its axis in a clockwise direction.
3. A connection system as claimed in Claim 1, in which the first rotary member (56) is attached to the extension pole (11) and the second rotary member (33) is attached to the paint brush (10), whereby circular motion of the extension pole 11 in a clockwise direction results in the brush (10) rotating about its axis in an anti-clockwise direction.
4. A connection system as claimed in Claim 2 in which the first rotary member (56) is located with the handle (13) of the brush (10).
5. A connection system for connecting an extension pole to a paint brush substantially as herein described with reference to the accompanying drawings.

According to one version of the invention, the first rotary member is attached to the paint brush and the second rotary member is attached to the extension pole. If the extension pole is moved with a circular motion in a clockwise direction this results in the brush rotating about its axis in a clockwise direction.

According to another version of the invention, the second rotary member is attached to the extension pole and the first rotary member is attached to the paint brush. If the extension pole is moved with a circular motion in an anti-clockwise direction this results in the brush rotating about its axis in an anti-clockwise direction.

Fig 1

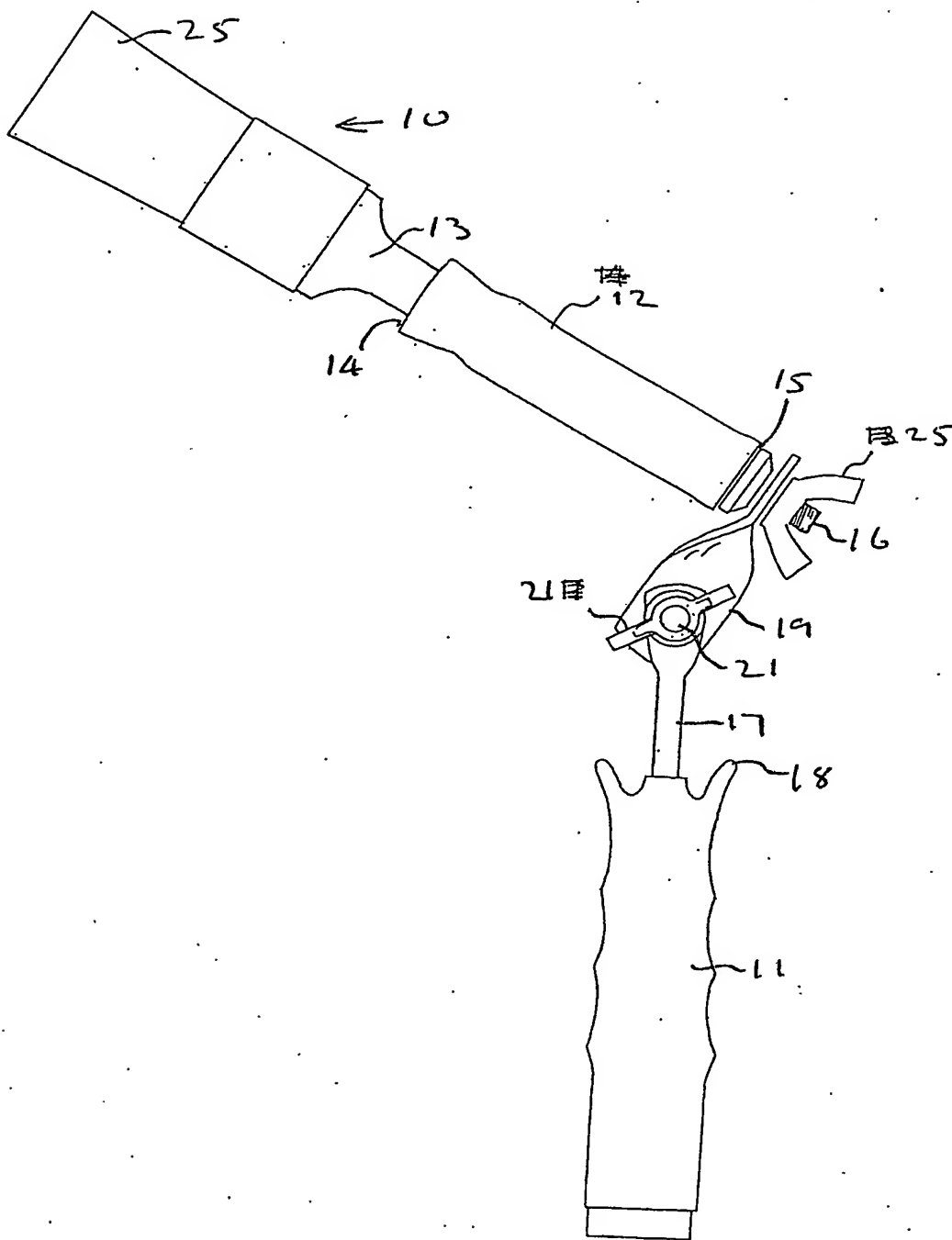
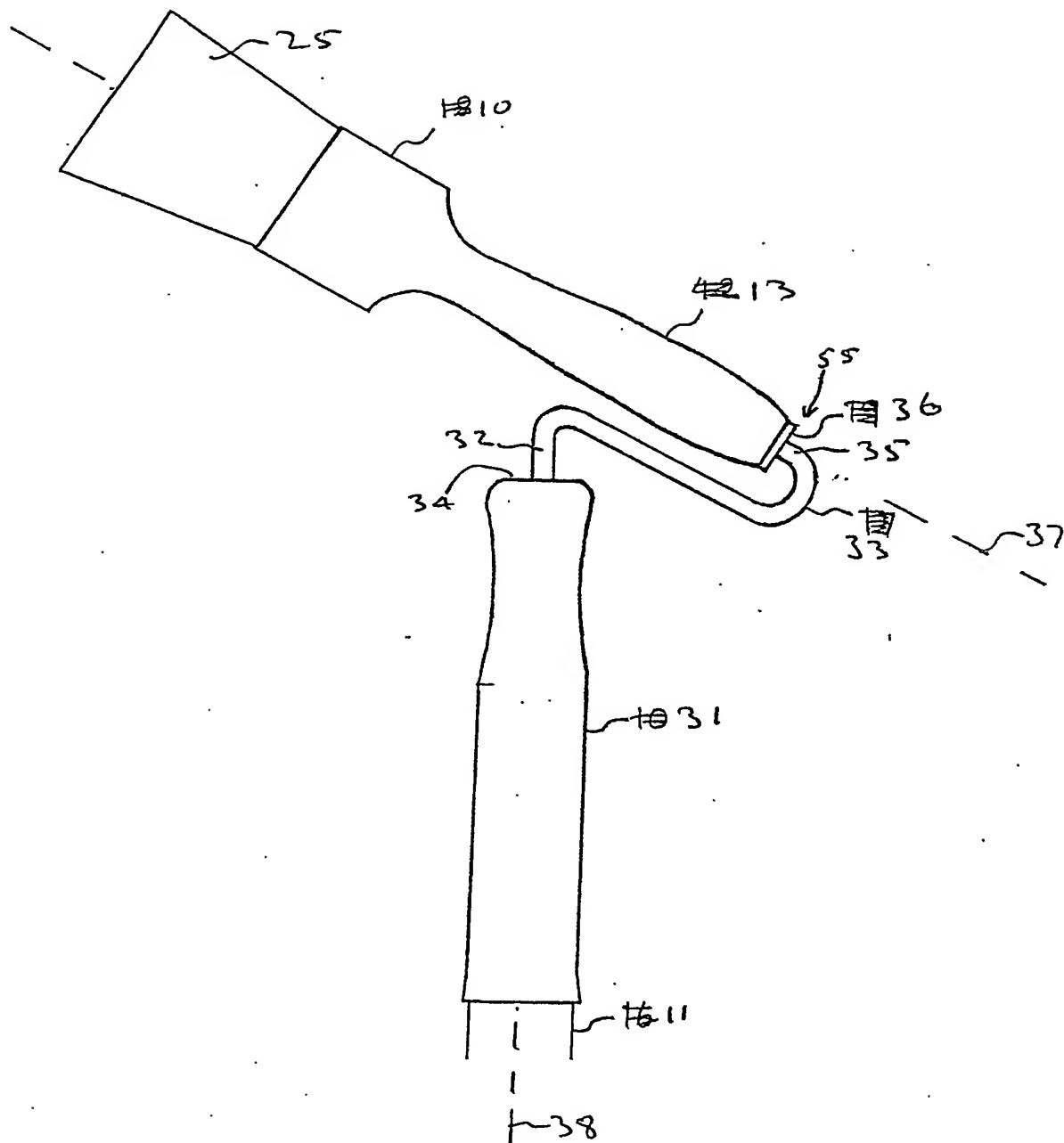


Fig 2



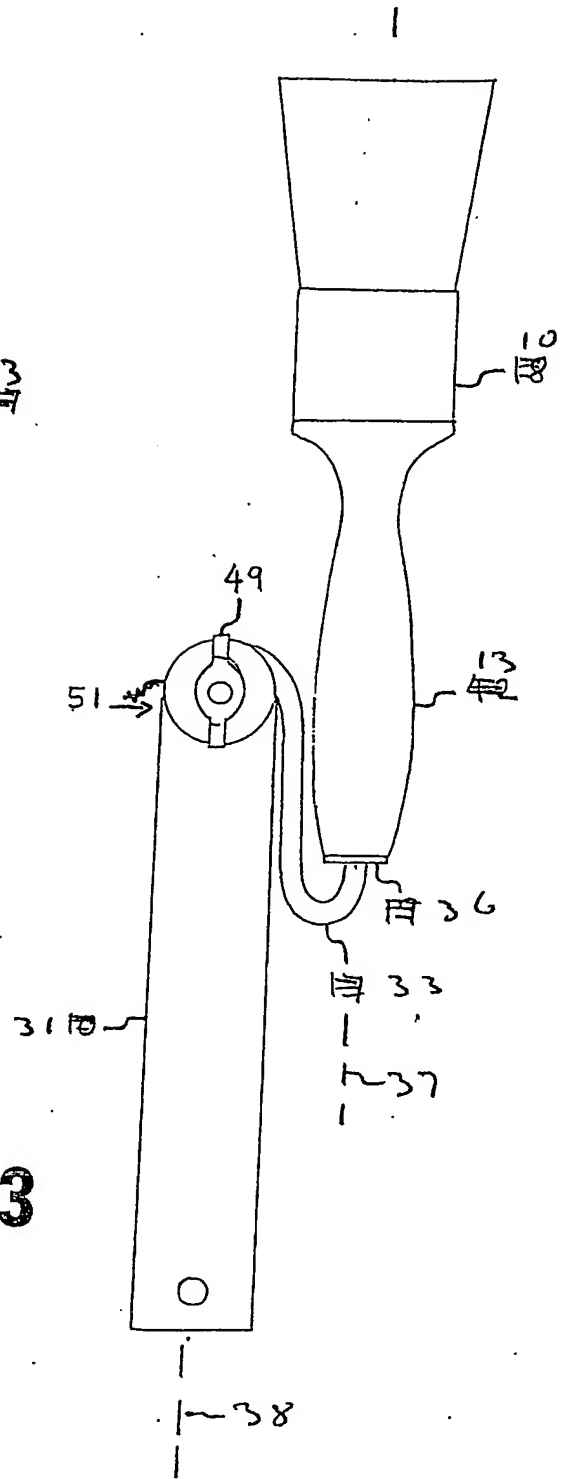
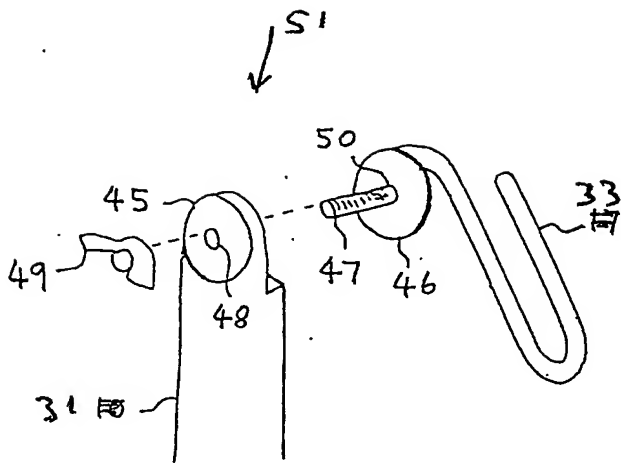


Fig 5

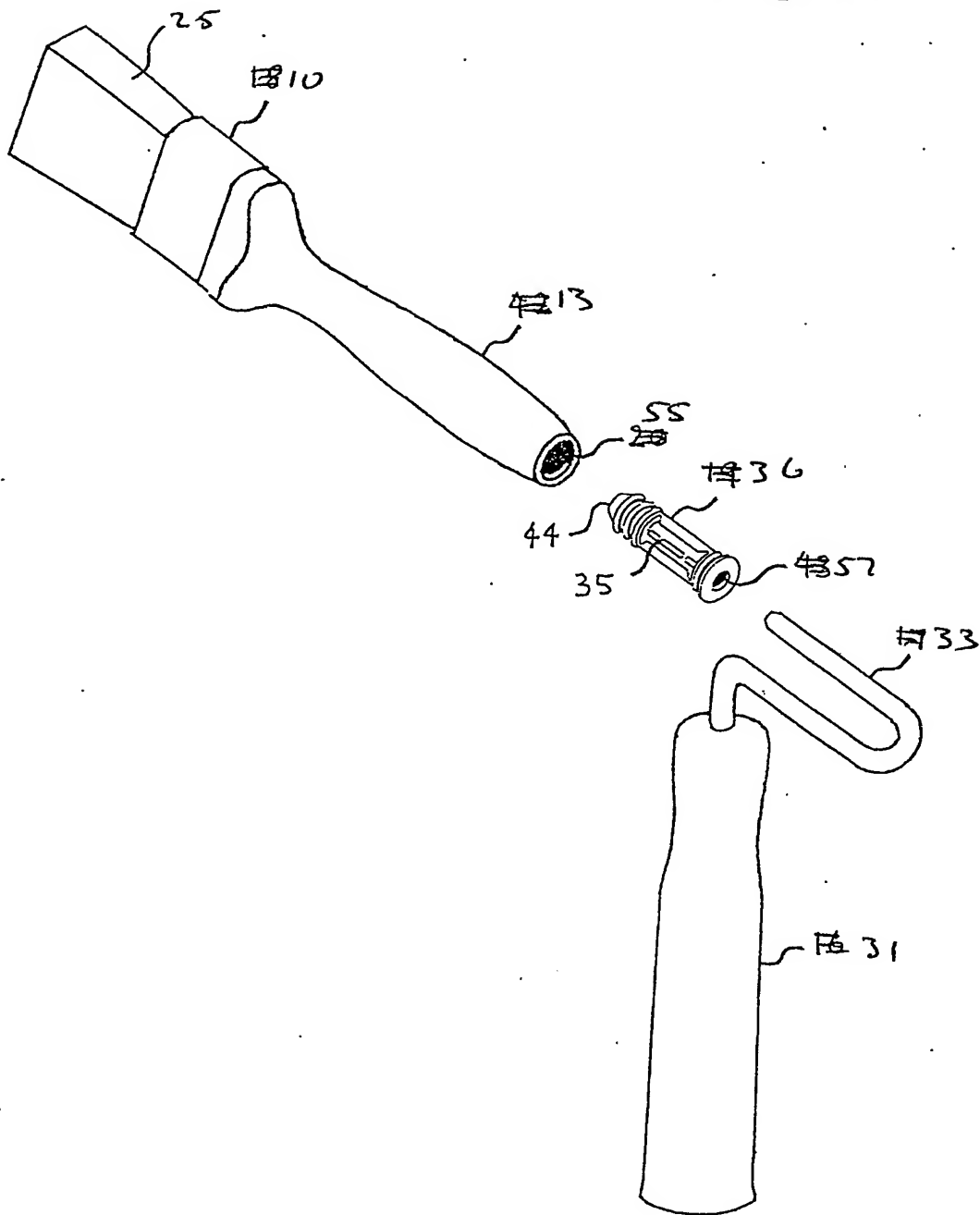


Fig 96

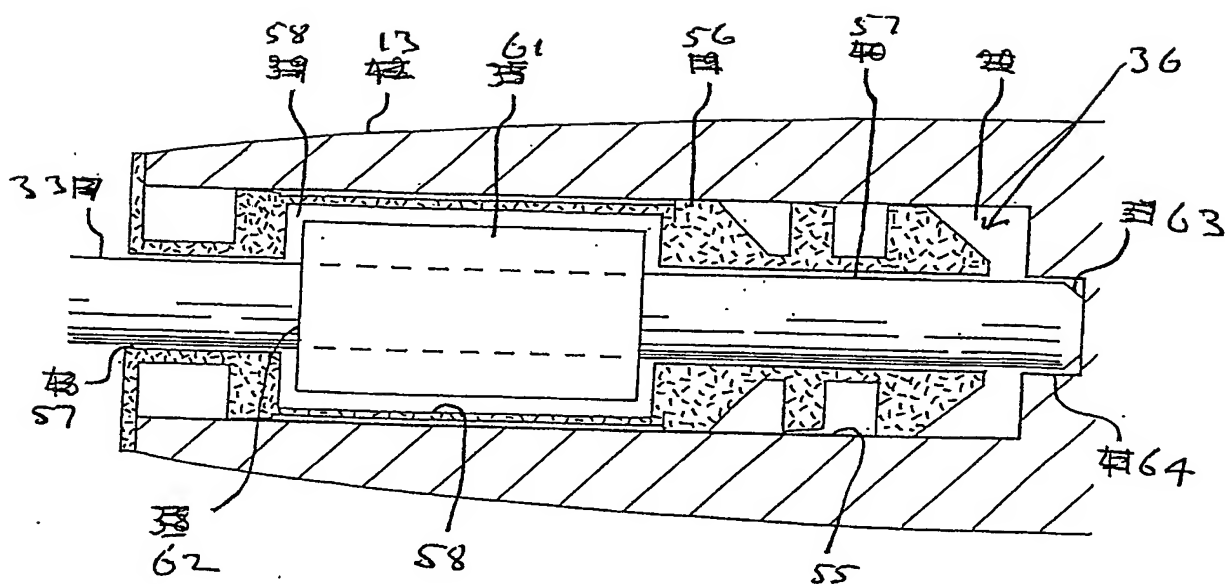
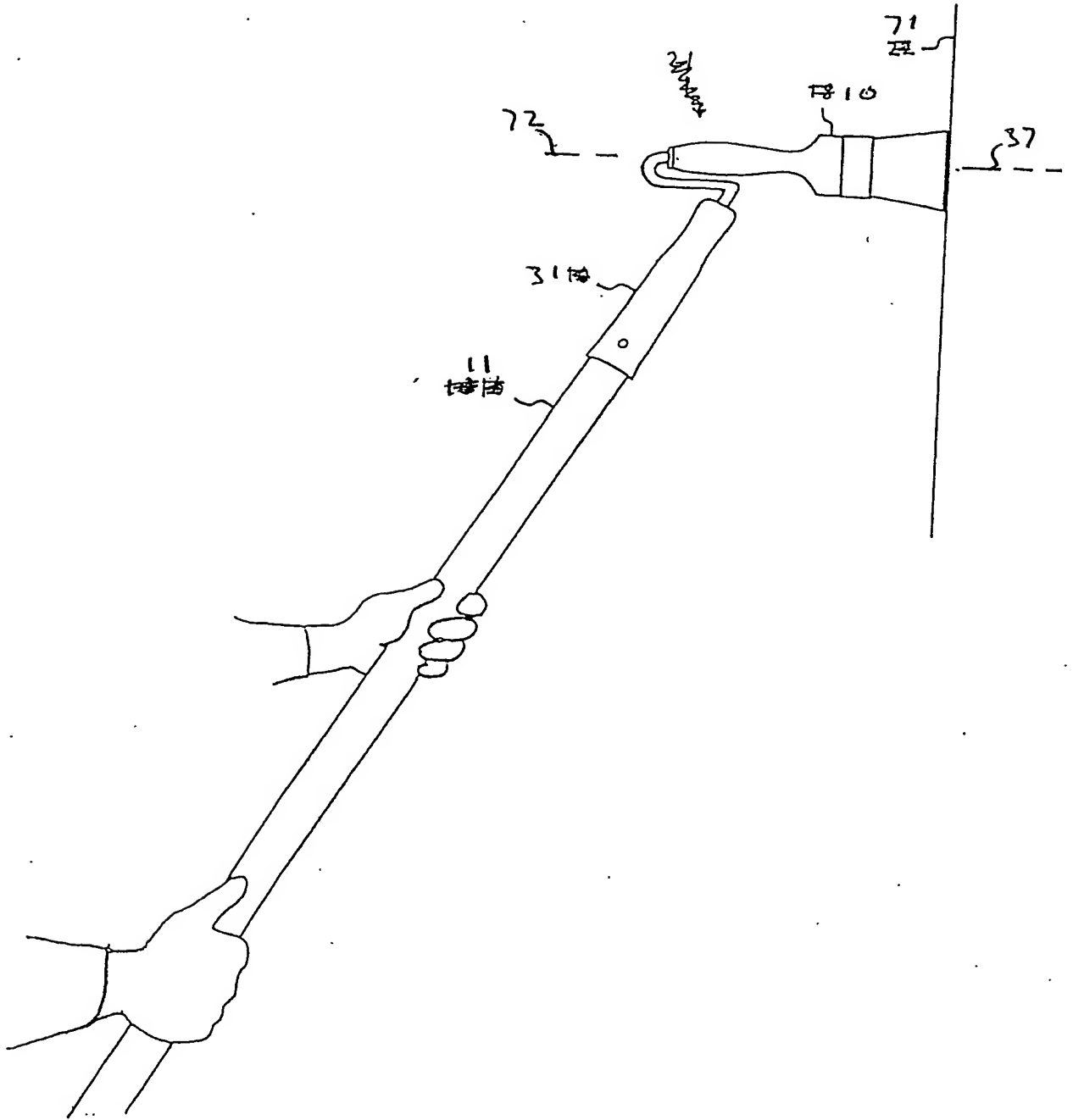


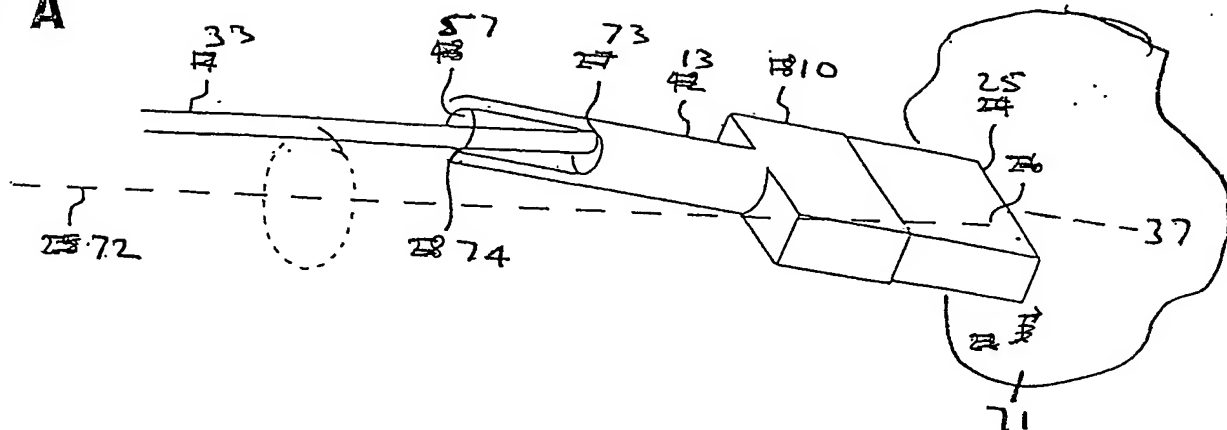
Fig 67



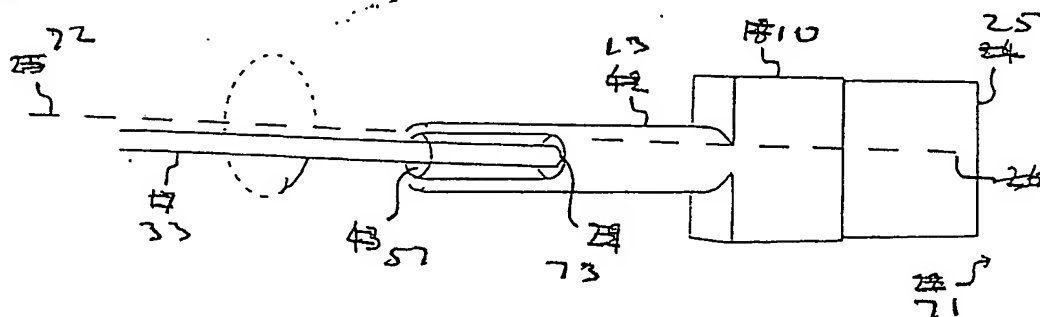
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Fig 7 8

8 A



8 B



8 C

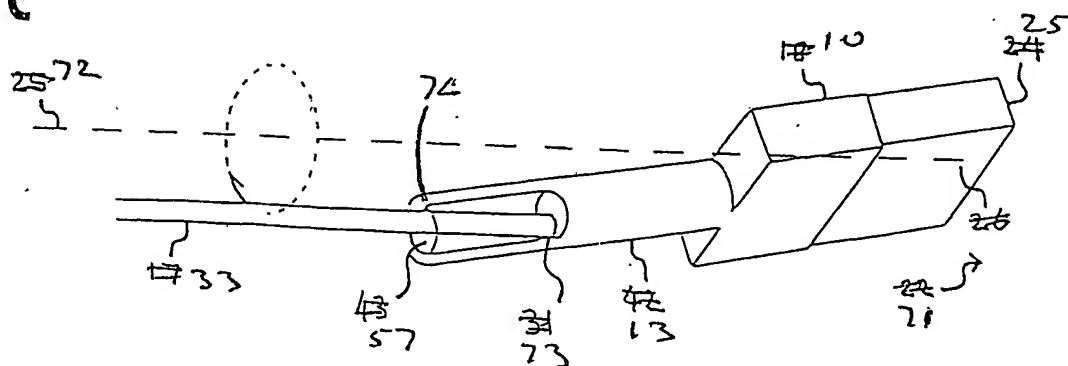
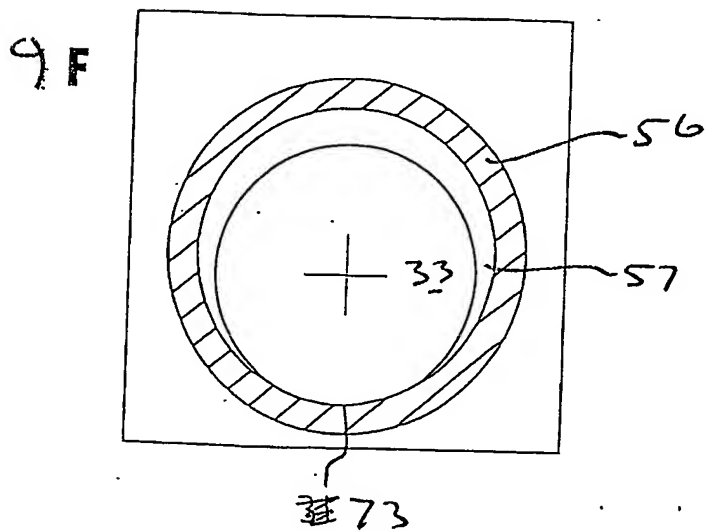
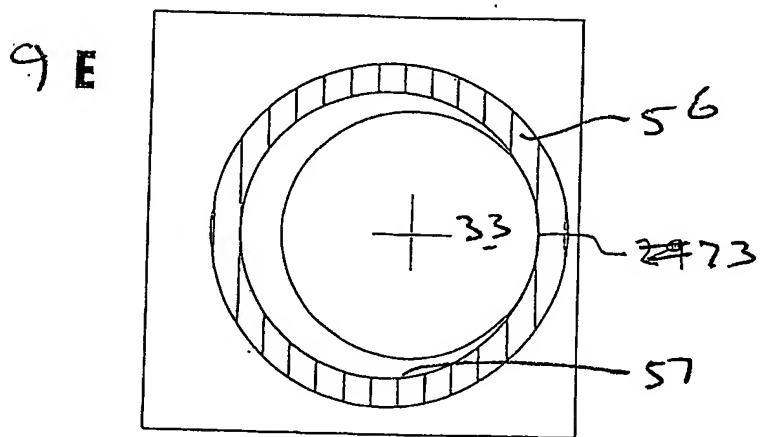
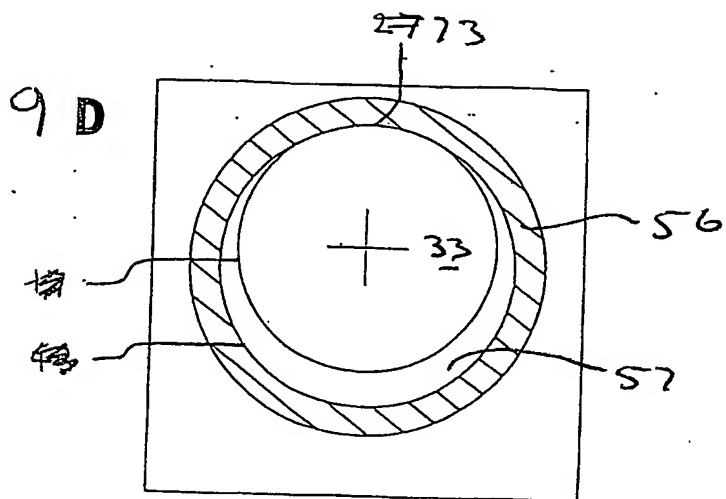


Fig 89



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